

High-Impulse, Scalable, Metal Plasma Thruster for Cubesat Missions, Phase I

Completed Technology Project (2018 - 2019)



Project Introduction

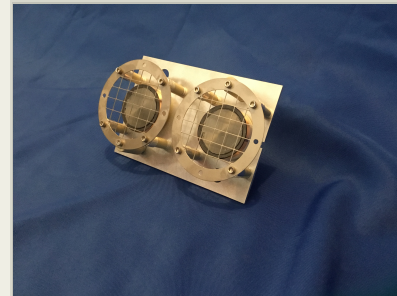
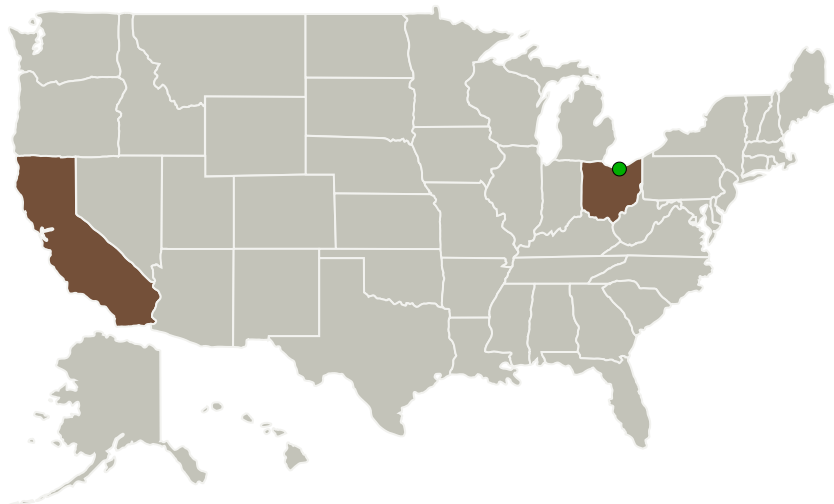
Alameda Applied Sciences has an opportunity (by working with Novawurks of Los Alamitos, CA) to secure flight heritage for its Metal Plasma Thruster (MPT-X). The MPT-X is an Electric Propulsion Thruster that delivers >4000 Ns of total impulse from a 1U package, with no moving parts, liquids or gases to be handled. The TRL-4 prototypes have been developed through several generations over two years. This SBIR affords an opportunity to integrate the MPT into Novawurks HISat platform and obtain flight heritage, to be followed by commercial sales to other satelliet builders and for NASA deep space missions.

Anticipated Benefits

NASA plans a new mission to study the insides of hurricanes (TROPICS) with a constellation of 12 CubeSats. The MPT is suited to this mission. The MPT is also suited to various other 6U CubeSat missions on the NASA calendar for deep space missions: Lunar IceCube, Lunar Flashlight, BioSentinel, NEA Scout, Mars InSight lander and INSPIRE.

We are in an era in LEO space where tasks that were once the province of huge 10-ton satellites are now in tiny satellites with a mass <100 kg. This paradigm shift from huge geosynchronous satellites, to tiny LEO satellites, enables us to generate a data set that is unprecedented in terms of coverage and cadence. The entire planet benefits from this growing revolution in LEO. Potential customers include Novawurks, Airbus, Blue Canyon Technologies, Hera Systems, Dauria Aerospace, and Planet.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Alameda Applied Sciences Corporation	Lead Organization	Industry Minority-Owned Business	San Leandro, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

California	Ohio
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Project Transitions

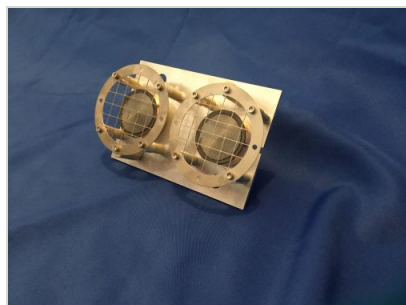
▶ **July 2018:** Project Start

✓ **February 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141091>)

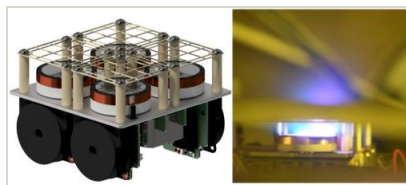
Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/132236>)



Final Summary Chart Image

High-Impulse, Scalable, Metal Plasma Thruster for Cubesat Missions, Phase I

(<https://techport.nasa.gov/image/126254>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Alameda Applied Sciences Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

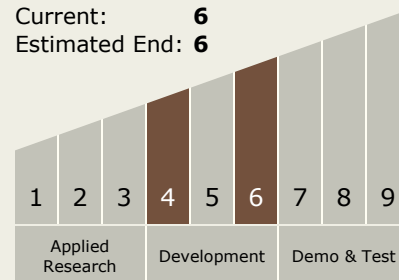
Mahadevan Krishnan

Technology Maturity (TRL)

Start: 4

Current: 6

Estimated End: 6



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.2 Electrostatic

Target Destinations

Earth, The Moon